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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

BIOLOGY **5090/22**

Paper 2 Theory **May/June 2012**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Section A
Answer **all** questions.
Write your answers in the spaces provided on the Question Paper.

Section B
Answer **both** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section C
Answer **either** question 8 **or** question 9.
Write your answers in the spaces provided on the Question Paper.

You are advised to spend no longer than one hour on Section A.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
Section A	
Section B	
Section C	
Total	

This document consists of **13** printed pages and **3** blank pages.

Section A

For Examiner's Use

Answer **all** the questions in this section.

Write your answers in the spaces provided.

1 Fig. 1.1 shows the human eye in horizontal section.

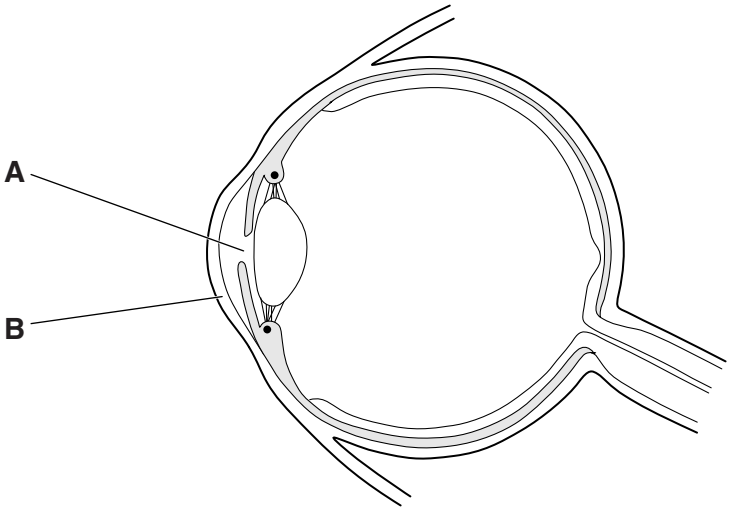

Fig. 1.1

(a) (i) Identify **A** and **B** that are labelled on Fig. 1.1.

A .....

B ..... [2]

(ii) Describe what happens to **A** when light entering the eye becomes less intense.

.....

..... [1]

(iii) Place a letter **Z** on Fig. 1.1 where a response occurs as a result of a reflex action. [1]

(b) In some people's eyes, the retina becomes completely detached from the tissues beneath. Explain how this will affect their ability to see.

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..... [3]

(c) As people get older, cloudy (opaque) patches sometimes form in the lens of the eye. These are called cataracts.
Suggest how cataracts might affect the ability of the lens to carry out its function.

For Examiner's Use

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..... [3]

[Total: 10]

2 Fig. 2.1 shows some of the information on the packets of two breakfast cereals.

For Examiner's Use

Cereal C

Nutrition Information

Typical value per 100 g

ENERGY	1623 kJ	
PROTEIN	13 g	
CARBOHYDRATE	78 g	
of which sugars	24 g	
starch	54 g	
FAT	1.5 g	
of which saturates	0.5 g	
FIBRE	2.5 g	
SODIUM	0.4 g	
SALT	1 g	
VITAMINS:	**(% GDA)**	
VITAMIN D	7.4 µg	(147)
VITAMIN C	88 mg	(147)
THIAMIN (B_1)	2.1 mg	(147)
RIBOFLAVIN (B_2)	2.4 mg	(147)
NIACIN	26.5 mg	(147)
VITAMIN B_6	2.9 mg	(147)
FOLIC ACID	294 µg	(147)
VITAMIN B_{12}	1.47 µg	(147)
MINERALS:		
IRON	16.2 mg	(73)

Cereal D

Nutrition Information

Typical value per 100 g

ENERGY	1600 kJ	
PROTEIN	10 g	
CARBOHYDRATE	68 g	
of which sugars	20 g	
starch	48 g	
FAT	5 g	
of which saturates	0.9 g	
FIBRE	9 g	
SODIUM	0.01 g	
SALT	0.03 g	
VITAMINS:	**(% GDA)**	
THIAMIN (B_1)	1 mg	(73)
RIBOFLAVIN (B_2)	2.3 mg	(145)
NIACIN	13.1 mg	(73)
VITAMIN B_6	2.9 mg	(145)
FOLIC ACID	290 µg	(145)
VITAMIN B_{12}	0.73 µg	(73)
MINERALS:		
IRON	10.2 mg	(73)

Fig. 2.1

(a) The Guideline Daily Amount (GDA) of energy for an average adult is 8 400 kJ.

(i) Calculate the percentage of this GDA a person would obtain by eating **one 25 g** serving of Cereal **D**. Show your working in the space provided.

Answer .....% [3]

(ii) State how the daily energy requirement of a hard-working farmer would differ from the GDA described above.

..... [1]

(b) Cereal **D** is considered to be better for people suffering from constipation than Cereal **C**. Suggest a reason for this.

For Examiner's Use

..... [1]

(c) Rickets is a condition that affects some children.

(i) Describe the symptoms of rickets.

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..... [2]

(ii) State which cereal, **C** or **D**, should be eaten by children to prevent rickets and explain your answer.

cereal .....

explanation .....

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..... [2]

[Total: 9]

3 In Fig. 3.1, the line drawn represents the cell membrane of a plant cell.

For Examiner's Use

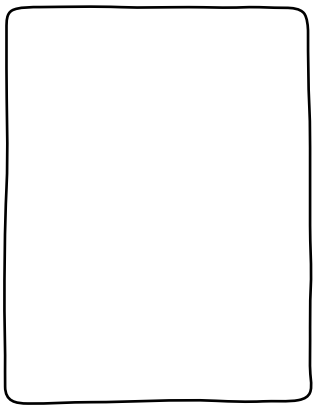

Fig. 3.1

(a) On Fig. 3.1 draw, name and label

(i) a structure that gives the cell its rigid shape,

(ii) a structure that contains chromosomes,

(iii) a structure that contains varying amounts of water, ions and sugars. [3]

(b) List three structural changes that must occur in young, unmodified plant cells as they develop into xylem tissue.

1 .....

2 .....

3 ..... [3]

(c) A small, leafy branch is cut from a tree. After some hours, the stem of the branch remains firm but the leaves become limp. Suggest an explanation for this.

stem remains firm .....

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leaves become limp .....

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..... [5]

[Total: 11]

4 Fig. 4.1 shows a section through a ripe fruit of a tomato plant.

For Examiner's Use

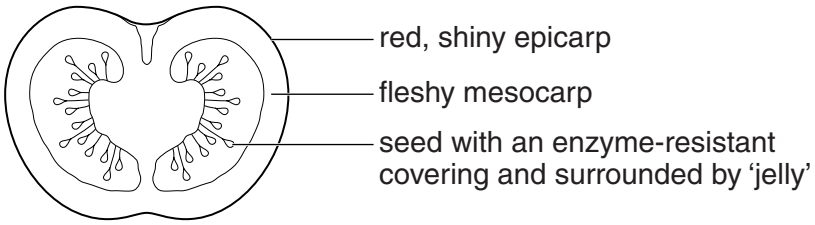

Fig. 4.1

(a) Suggest and describe how seeds in this fruit may be dispersed.

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..... [5]

(b) Normal tomato plants are diploid (2n), having two sets of chromosomes in each cell. However, some tomato plants are triploid, having three sets of chromosomes (3n) in each cell. This can be an advantage as these plants produce larger fruits.

(i) Suggest a reason why it may be a **disadvantage** to have three sets of chromosomes.

..... [1]

(ii) Suggest why the triploid condition is more common in plants than in animals.

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..... [2]

(c) Explain how two parents who do not have Down's syndrome can produce a child who has the syndrome.

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..... [3]

[Total:11]

[Turn over

For Examiner's Use

5 **(a)** Fig. 5.1 shows the effect of temperature on the activity of enzyme **E**.

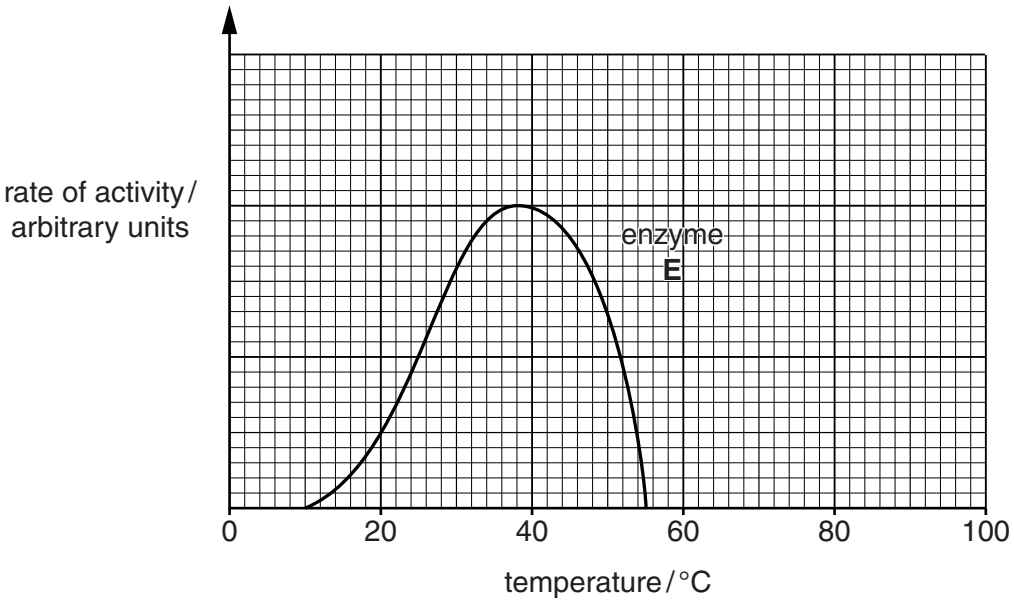

Fig. 5.1

(i) State the optimum temperature for enzyme **E**. ..... [1]

(ii) Suggest a possible identity for enzyme **E**, where it is found, and its function.

identity of enzyme **E** .....

where it is found .....

function .....

[3]

(b) Fig. 5.2 shows the effect of temperature on the activity of another enzyme, **F**.

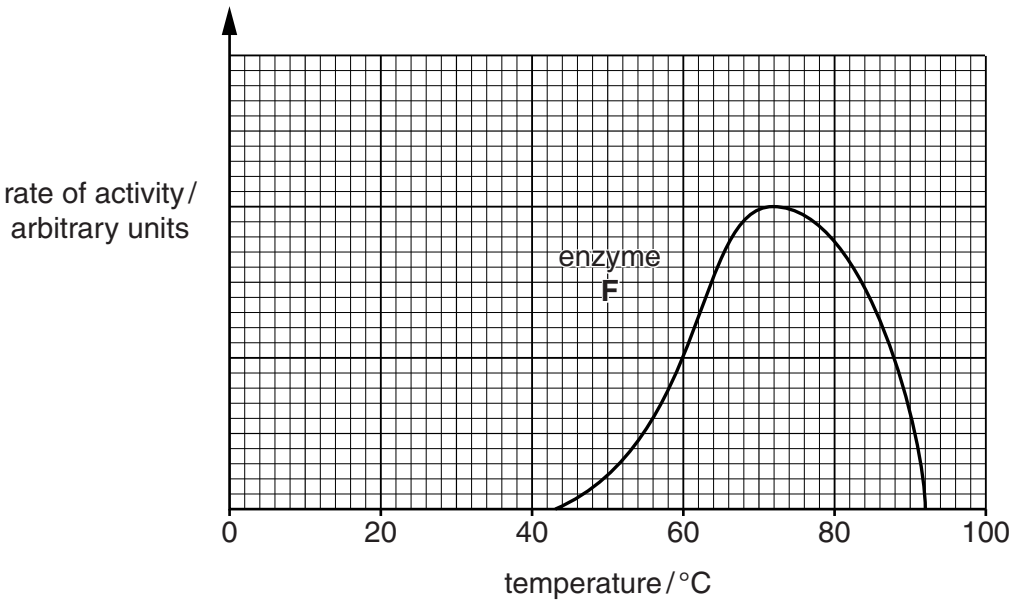

Fig. 5.2

State and explain what would happen to the activity of enzyme **E** at the optimum temperature for enzyme **F**.

For Examiner's Use

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..... [5]

[Total: 9]

[Turn over

Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

For Examiner's Use

6 **(a)** Describe the structure of a seed, stating the functions of the features you mention.

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(b) Describe and explain the processes that occur when a seed germinates.

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[Total: 10]

7 **(a)** Explain what is meant by the term *pyramid of numbers*.

For Examiner's Use

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(b) Explain the fact that energy flow is non-cyclical.

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[Total: 10]

[Turn over

Section C

For Examiner's Use

Answer **either** question 8 **or** question 9.

Write your answers in the spaces provided.

8 **(a)** **(i)** Explain the term *osmosis*.

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(ii) Explain the ways in which *active transport* is different from *osmosis*.

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(b) Explain how it is possible for oxygen in the lungs to diffuse rapidly into the blood.

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..... [2]

[Total: 10]

9 **(a)** Describe the removal of excretory products from the human body.

For Examiner's Use

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..... [8]

(b) Explain why the removal of faeces from the body is **not** regarded as excretion.

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..... [2]

[Total: 10]

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